

REMARKS

As a preliminary matter, Applicants thank the Examiner for the allowance of claims 20-29.

Claims 1-19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (U.S. 2002/0097016) in view of Bolash et al. (U.S. 5,936,371), Redlich (U.S. 5,450,521), and White et al. (Applicant's presume the Examiner refers to U.S. 5,459,432). Applicant's respectfully traverse this rejection because none of the cited reference, whether taken alone or in combination, teaches or suggests a switching circuit that performs a non-inversion of a duty cycle when a PWM signal is not present, as in claim 1 of the present invention, or functions as a buffer circuit when the PWM signal is not present, as in claim 6.

The Examiner correctly acknowledges that Tanaka fails to disclose the switching circuit of the present invention. Of the three remaining cited references, the Examiner relies only upon Redlich for disclosing such features. Redlich, however, does not teach or suggest the switching circuit of the present invention.

Although the Examiner is correct that Redlich teaches a switching circuit that utilizes an Exclusive-OR operation, Redlich's circuit does not function as asserted by the Examiner, that is, as claimed in independent claim 1 of the present invention. Redlich specifically teaches that, for a bipolar PWM signal, the Exclusive-OR operation performs a non-inversion when the polarity of the PWM signal is low, and an inversion when the polarity is high. (See col. 5, lines 20-29; Fig. 1a). In other words, Redlich's switching function is dependent on the *polarity* of the PWM signal, and not the existence of the signal

itself. According to Redlich, the PWM signal is always present when the switching between inversion/non-inversion is performed.

In contrast, claim 1 of the present invention recites, among other things, that the non-inversion of the duty cycle is performed by the switching circuit when the PWM signal is not present. As discussed above, Redlich fails to teach such a switching circuit. Redlich is only concerned with the polarity of the existing PWM signal, and not whether the PWM signal is actually present. The Examiner has not cited any of the other three references for teaching a switching circuit, and therefore a *prima facie* case of obviousness has not been established against the present invention. (See Section 2143.03 of the MPEP).

In addition to traversing the rejection for failing to teach or suggest all of the features and limitations of the present invention, Applicants further traverse the outstanding obviousness rejection because none of the four cited references, alone or in combination, address or solve the problems faced by the present invention. The stepper motor of claim 1 of the present invention advantageously is capable of protecting the motor in the event of any loss of the PWM signal. The advantageous features of the switching circuit of the present invention thus avoid problems associated with sending power across the motor when the PWM signal is lost. None of the four cited references teach, or even suggest, that such a problem exists, let alone a solution as provided by the present invention. Because the problems faced and solved by the present inventors should be considered in determining the appropriateness of the Section 103 rejection, the outstanding rejection is therefore further traversed for at least these additional reasons.

The advantages of the present invention discussed above become even more readily apparent when examined in relation with the charge pump features of the present invention. Applicants take note of the fact that the Examiner does not cite to Redlich for teaching the charge pump, but instead only to White. White does disclose a charge pump, but not one which functions according to the present invention. Claim 5 of the present invention, for example, specifically recites that the charge pump shuts down when the PWM signal is not present. As discussed above though, none of the four cited references even addresses the condition of the motor where a PWM signal is lost, or not present. A polarity-dependent switching circuit cannot address this condition, and thus there could be no motivation to combine White with Redlich to reach the present invention. The obviousness rejection is therefore further traversed for these still further reasons.

Independent claim 6 of the present invention recites features similar to those of independent claim 1 discussed above in traversing the obviousness rejection, namely, that the switching circuit functions as a buffer circuit when the PWM signal is not present. None of the four cited references teach such features. The Examiner has only identified a switching circuit which functions as an inverter, but not as a buffer circuit, and more particularly one which is responsive to the loss of signal. Claims 2-5 depend directly or indirectly from independent claim 1, and claims 7-19 depend directly or indirectly from independent claim 6, and therefore all of these dependent claims include all of the features of their respective base claims, plus additional features. The rejection of these dependent claims is therefore also

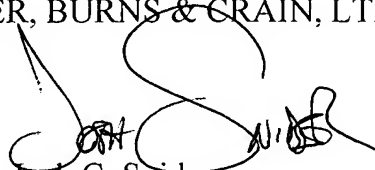
traversed for at least the reasons discussed above traversing the rejection of the independent claims.

For all of the foregoing reasons, Applicants submit that this Application, including claims 1-29, is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

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